

**Lawrence Berkeley National Laboratory  
Project Management Office**

**PROCEDURE** Page  
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COST ESTIMATING

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**1.0 PURPOSE**

This document describes the methodology for establishing cost estimates for projects at LBNL in a manner that is compliant with the standards for implementation of appropriate Project Management controls and Earned Value Management.

**2.0 SCOPE**

Cost estimates, including Estimate to Complete (ETC), are prepared in a clear, consistent, comprehensive format that facilitates review of details and assumptions throughout the cost estimation process. Activities to be estimated are identified in sufficient detail to support the cost estimate methodology used.

The objectives of the cost estimating process are to: (1) support the establishment of the Performance Measurement Baseline (PMB); (2) serve as the basis for change control; and (3) support the establishment of the ETC. Project cost estimates shall be traceable to documented sources and based on accepted methodologies.

**3.0 REFERENCES**

DOE Order 413.3.  
LBNL Earned Value Management System Description.

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LBNL CFO Rate Book.

PMO Procedure 1.2, Work Breakdown Structure (WBS).

PMO Procedure 1.5, Control Account Plan/Work Authorization.

PMO Procedure 1.6, Project Schedule.

### 4.0 PROCEDURE

#### 4.1 Estimate Preparation and Review

The estimate preparation phase begins with the issuance of guidance and instructions from the Project Manager and encompasses those activities that translate technical design and fabrication into detailed labor and procurement elements (organized by Work Breakdown Structure (WBS)) and identified costs.

Labor rate tables, indirect costs, and escalation rates will be provided by Project Controls to assist Control Account Managers (CAMs) in budget development. The Project Manager will review this information and approve all budget plans prior to implementation.

Escalation should generally be based on rates provided by the Department of Energy (DOE) as published in the LBNL Forward Pricing Sheet (aka CFO Rate Book). Judgment should be used to verify the appropriateness of the published rate in light of current market conditions. Documentation of the rates used and the basis should be maintained.

The resulting cost estimate should be analyzed for appropriate time-phasing with budget authority and budget outlay, consistent with the project appropriation profile, as directed by the Funding Agency.

##### 4.1.1 Preparation of Detailed Estimate

CAMs shall be responsible for preparing or obtaining cost estimates for Work Packages and Planning Packages. The CAMs will forward copies of the estimates to Project Controls for validation.

##### 4.1.2 Cost Estimate Methodology

The result of the project cost estimate process shall be the CAMs most current, detailed cost estimate, commensurate with design maturity. The CAM will use one of the approved methodologies:

A description of these methodologies is provided in the Appendix. CAMs should use Categories 1, 2, 3, and 7 when possible, especially for high-cost items, as this will provide maximum estimate support. The CAMs' basis for all

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estimates will be documented for each project and retained by the Project Manager, with a copy provided to Project Controls. The documentation includes files to support project cost estimates (such as books, vendor quotes, engineering notes, memos, records of conversations with vendors, drawings, code output) with appropriate safeguards for proprietary information provided.

Cost estimates are developed for each WBS element at the Work Package level or lower as deemed necessary by the CAMs. They shall be broken down by project phase, institution, and labor discipline as appropriate. Items and activities in the estimate shall be of sufficient detail to support interpretation by independent reviewers.

### 4.2 Documentation

The Project Manager shall control supporting documentation and ensure that it is retained by WBS element. The Project Manager shall forward copies of the documentation to Project Controls. Proper care shall be given to protect business-confidential and proprietary information from unauthorized disclosure.

Documents and records generated as a result of implementing this procedure shall be generated in a manner suitable for reproduction and signed and dated at the time of completion or approval. Official signed documents shall be retained by the Project Manager, with copies to Project Controls. Documents, records, and work papers shall include but not be limited to the following:

- Estimate Spreadsheets.
- Work papers, including vendor quotes, telephone records, material take-offs, basis notes, calculations, etc.
- Analysis, such as contingencies, escalation application, and quantity discounts.
- Estimating codes, such as labor disciplines and phase codes.
- Application rates and associated application methodology.

### 4.3 Management Reserve/Contingency

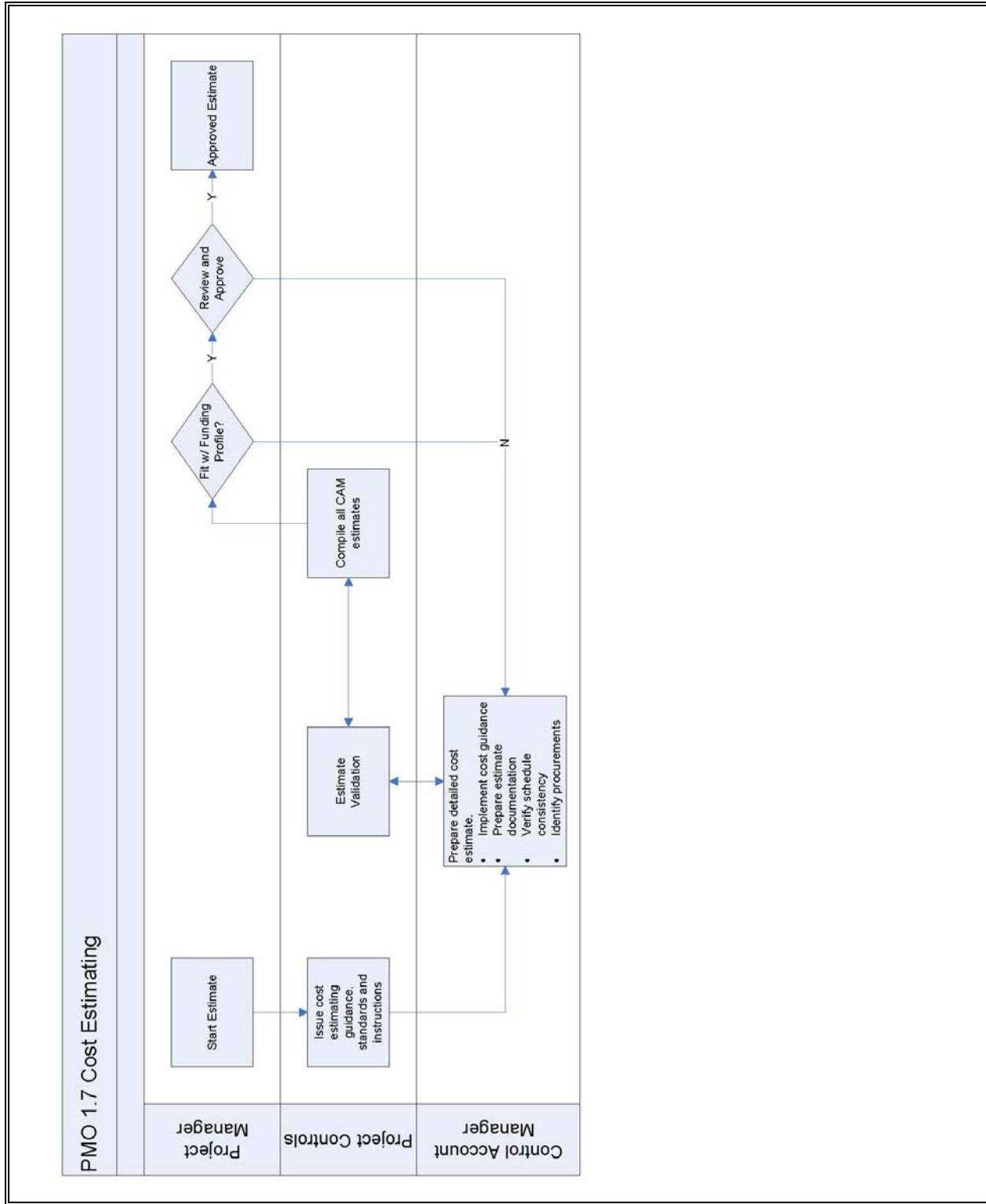
The Project Manager, CAMs, and other Stakeholders shall work together to determine a risk-based level of Management Reserve/Contingency.

## 5.0 APPENDIX

**Title****COST ESTIMATING**

Appendix A: Cost Estimating Process.  
Appendix B: Estimate Methodologies.

<b>Title</b>	APPENDIX A: COST ESTIMATING PROCESS
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**Title****APPENDIX B: ESTIMATE METHODOLOGIES****Estimate Methodologies**

Code	Type of Estimate	Description
1	Catalog Listing or Industrial/ Construction Databases	This category will be used when most of the costs in an estimate can be documented from current vendor catalogs or from published or proprietary industrial or construction databases.
2	Documented vendor Estimate Based on Drawings/Sketches and Specifications	The estimate is primarily based on vendor estimates obtained for the specific item or activity. To the extent possible, these estimates will be written rather than oral. If the latter, they will be documented. Such quotes by a vendor indicate that a design is sufficiently mature that its cost can be independently estimated (i.e., significant detail in drawings and specifications have been prepared), although the quotes will not be taken as an offer to sell at that price.
3	Engineering Estimate Based on Drawings/Sketches and Specifications.	Estimates in this category have the same level of detail available as in (2) above, but the estimates are done by an expert estimator at LBNL, or a subcontractor who is not likely to be a vendor.
4	Engineering Estimated Based on Similar Items or Procedures	Estimates are chiefly based on items or activities that have previously been procured or undertaken. The basis for scaling up or down, or "factoring" (e.g., known cost sensitivities) should be documented in the Estimate Files. Given the variable degree of similarity between components of various LBNL projects, judgment must be used in selecting between (4) and (5).
5	Engineering Estimate Based on Analysis	Estimates of items or procedures that are different from previous experience, and while sketches and specifications may exist, the level of detail is not sufficient to quality for (3) above. Some labor costs, such as assembly of an item not previously built, may fall into this category. Supporting background for procured items would include, for example, standard costs for fabricating a given material and the mass of material needed.
6	Expert Opinion (Engineering Allowance)	This category should be used for items or procedures having little documented basis for the estimate. It indicates little confidence in the estimate. Its use should obviously be minimized in the final estimate. It will be used as the estimate preparation develops, however, to measure the maturity of the estimate at any given point.
7	Existing Lien	A contract has already been awarded.